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NEW USSR WORK ON THE PHYSIOLOGY OF VASCULAR REFLEXES

[Comment: This is an abstract of an article by R.A. Dymshits published under the title "Concerning the Problem of the Physiology of Vascular Reflexes" in *Fiziologichnyi Zhurnal*, Vol 1, No 4, Kiev, Jul-Aug 1955, pp 70-74, as a contribution from the Chair of Pathological Physiology, Chelyabinsk Medical Institute.

Numbers in parentheses refer to the author's bibliography, appended.]

G.P. Konradi (1, 2) and A.G. Bukht'yarov (3) established that injection of a 20% solution of sodium chloride produces a different reaction depending on whether the solution has been injected intra-arterially or intravenously. Intra-arterial injection produces a pressor effect while intravenous injection exerts a depressor effect on the vascular system. G.K. Popov later found in work carried on at the Laboratory of the Chair of Pathological Physiology, Chelyabinsk Medical Institute, that intra-arterial injection of a solution of sodium chloride of this strength weakens the tonus of the small intestine of dogs and inhibits peristalsis while intravenous injection increases the tonus and strengthens the peristalsis (4).

On the basis of these results the conclusion was made that intra-arterial introduction of irritants produces a reflex excitation of the sympathetic division of the vegetative nervous system while intravenous introduction produces an excitation of the parasympathetic division. To check this conclusion, an investigation of the sympathomimetic and cholinergic properties of the blood was carried out after intra-arterial and intravenous injections of a 20% sodium chloride solution.

The experiments were carried out on adult dogs which had not been fed. Eight dogs were used for the investigation of the sympathomimetic properties of the blood and seven dogs for the investigation of the cholinergic properties.

The blood and blood serum taken from the dogs prior to the experiments were found to accelerate and strengthen the contractions of a frog's heart. After intra-arterial injection of a 20% salt solution both the blood and blood serum exerted a stronger stimulating effect on the contractions of a frog's heart than before the injection.

Tests carried out with blood taken after intravenous administration of the salt solution showed that the inotropic and chronotropic effects exerted by this blood on the isolated heart of the frog are less pronounced than those produced by the blood after irritation of the arterial receptors.

The results of the investigations which have been carried out in this instance indicate that under the effect of the irritation produced by the salt, substances which are very active with respect to a frog's heart appear in the blood of dogs. These substances are apparently of a sympathomimetic type. They appear as a result of a stimulation of the sympathetic division of the vegetative nervous system.

Tests carried out on the eserinizated dorsal muscle of leeches have shown that after intravenous administration of a 20% sodium chloride solution a considerable increase takes place in the acetylcholine content of the blood of dogs. Under the effect of the blood taken from dogs after intravenous injection of the salt solution the contraction of the leech muscle increased greatly, which testifies to an increased content of acetylcholine in the blood as compared with the content of this substance before the injection.

STAT

It should be noted that no increase in the acetylcholine level was observed after administration of a 20% sodium chloride solution into the femoral artery of dogs.

We may thus conclude that after introduction into the arterial blood flow (countercurrently) of a 20% sodium chloride solution neurohumoral changes of a sympathergic character arise. On the other hand, intravenous introduction of the same solution produces predominantly cholinergic reactions in the body.

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